

the illustrations are excellent. Lillie's "Development of the Chick" is, indeed, one of the hand-somest books available for embryological study, and it will be indispensable in every laboratory, though we should not care to regard it as a text-book of embryology for the student in quest of the scientific principles underlying animal development. B.

#### MODERN EXPLOSIVES.

*The Manufacture of Explosives. Twenty Years' Progress.* Four Cantor Lectures delivered at the Royal Society of Arts in November and December, 1908, by Oscar Guttman. Pp. viii+84. (London: Whittaker and Co., 1909.) Price 3s. net.

IT is now fourteen years since Prof. V. B. Lewes gave a series of Cantor lectures at the Royal Society of Arts on "Modern Explosives." The period which has elapsed has been so fruitful in research and manufacturing improvements that the series of lectures delivered by Mr. Guttman, which form the subject of the present volume, is very welcome.

Mr. Guttman's treatise on "The Manufacture of Modern Explosives" was published in 1895, and the present small volume is a useful addendum to the larger work. As is pointed out in the preface, it is impossible in so small a compass to give more than a general outline of the many improvements and researches during the past twenty years, but this outline is certainly valuable, especially as the author gives full references to all important patents and papers.

In spite of all advances, it is of interest to note that black powder was employed in mines and quarries to the extent of 7000 tons in 1907. In addition, nearly 3500 tons of "safety" explosives were also used. The world's annual production of celluloid is put at the enormous total of 24,000 tons, whilst artificial silk reached the astonishing total of 5000 tons.

Nitro-cotton in some form or other is, without doubt, the most important explosive compound at present made, not only because it forms the basis of all smokeless propellant explosives, but also of celluloid and artificial silk. No possible pains must be spared to ensure stability of the nitro-cotton, and the causes which may give rise to instability or promote further decomposition are well treated by the author, but many will differ from him as to the extent of deterioration arising from the preliminary treatment of the cotton and the effect of alkaline stabilisers. It will be admitted that nitro-cotton has its defects, but such statements as "picric acid is a treacherous substance," "a more inconvenient material still is nitro-cotton," "we have an almost uncontrollable substance in nitro-cotton," are open to criticism. Later the author himself says that the stability of nitro-cotton below 20° C. is assured.

So far as our Navy is concerned, exception must be taken to the statement that "it was and still is the practice in men-of-war to arrange the ammunition stores and powder magazines in close proximity to boilers and engines, frequently without any ventila-

tion." This has never been our practice; there have been unavoidable instances where such an arrangement has been forced upon designers by other considerations, but in such cases the magazines have been thoroughly heat-insulated. Moreover, magazines have always been specially ventilated independently of the general ventilation of the ship. It is fully recognised by those responsible for the designs that the lower the temperature the better preserved will be the powder, and for that reason refrigerating machinery has been introduced, but the author's fear as to possible breakdown at a critical moment has not been left unprovided for by men who can evolve such an engine of destruction as a modern battleship.

One turns hopefully to the question, "What will be the powder of the future?" only to find that "the future belongs to a stable nitro-compound of the aromatic series." Possibly; but is there even remote promise of the production of any such body which will meet the varied requirements of a smokeless propellant as distinct from a simple explosive substance? J. S. S. B.

#### CHEMICAL ANALYSIS FOR STEEL-WORKS' LABORATORIES.

*Rapid Methods for the Chemical Analysis of Special Steels, Steel-making Alloys, and Graphite.* By C. M. Johnson. Pp. vi+221. (New York: John Wiley and Sons; London: Chapman and Hall, Ltd., 1909.) Price 12s. 6d. net.

THE author of this book gives a detailed account of his methods for the determination of chromium, vanadium, copper, titanium, nickel, molybdenum, and tungsten in steel and steel-making alloys, besides those for the ordinarily occurring elements, viz. carbon, silicon, sulphur, phosphorus, and manganese. No reference is made to tantalum and uranium.

Most of the methods described are to be found in the standard English works on the subject, but there are several new features which deserve to procure a place for the book in all steel-works' laboratories. Of these features, the exact determination of phosphorus in ferro-vanadium, and the application of potassium ferricyanide to the separation of small amounts of copper and nickel from large amounts of iron are specially worthy of note.

Many of the methods described, however, are by no means "rapid," and much unnecessary time is spent in fusions, washing precipitates, &c. The analysis of tungsten powder is very tedious, although the author supplements his methods by a well-known rapid method of English origin, erroneously stated by him to give low results. Again, the author fuses impure tungstic oxide residues with about four times the necessary amount of sodium carbonate and for at least four times longer than necessary, whilst two hours are required for lead molybdate to settle, whereas it may be safely filtered off immediately after its formation. Many other similar points might be cited which are of little importance beyond the fact that the author aims, as the title-page suggests, at rapidity of execution.

The determination of carbon is dealt with very well indeed, and it is shown that the most trustworthy method is that of burning the drillings mixed with red lead in a stream of oxygen. This direct combustion process has been in constant use in most of the Sheffield works' laboratories for several years. Red lead is at present, however, being largely discarded in favour of pure manganese dioxide, which is in nearly every case quite as effective, and more than doubles the life of a porcelain boat.

The concluding chapters of the book include one on the examination of graphite and graphite crucibles, and one on the annealing of steel. In the former, the existence of silicon carbide in used plumbago crucibles is considered, and an account given of the determination of its amount. The chapter on the annealing of steel, to which attention is specially directed in the preface, contains the extraordinary statement that "rapid cooling of perfectly annealed steel has no effect whatever on its hardness." The author considers steel to be perfectly annealed when it has been kept at 700–720° C. for from ten to twelve hours, and states that it may then be cooled slowly or quickly—in fact, it may be plunged whilst at this temperature into cold water—without becoming hard. This statement cannot be accepted.

The book is very well printed, is singularly free from typographical errors, and is provided with an excellent index.

The author may be interested, by the way, to learn that the use of silver iodide indicators in the cyanide titration of copper solutions was suggested twelve years ago in the *Chemical News*. F. I.

#### HYPNOSIS AND SUGGESTION.

*Die Hypnose und die Suggestion, ihre Wesen, ihre Wirkungsweise und ihre Bedeutung und Stellung unter den Heilmitteln.* By Dr. W. Hilger. Pp. 185. (Jena: Gustav Fischer, 1909.)

THIS is a most interesting, scientific and readable book. After a somewhat detailed historical introduction, the author demonstrates in a clearer way than we have hitherto read, that there is at least a very close resemblance between normal and hypnotic sleep; indeed, one is left with the impression that there is practically no difference between them. *Inter alia* it is pointed out that there is an element of sub-conscious thought even in normal sleep, and that this is only partial (Teilschlaf); and, among other examples, the oft-cited mother is instanced who sleeps soundly through the noise of traffic or a thunderstorm, but wakes at the feeblest cry of her new-born child.

In discussing the nature of suggestion, Dr. Hilger directs attention to what he calls mental (seelische) reflexes, such as the flow of saliva at the thought of food, contraction of the pupils on thinking of a bright light, erection of the nipples and flow of milk when a lactating mother thinks of suckling her child, and so on. He also points out that memory-images are stronger in normal sleep than during waking hours, just as they are in hypnotic sleep. Some methods of hypnosis are described, and it is rightly said that a

feeling of goodwill between the patient and the physician is essential to successful hypnotism.

In a chapter on suggestion and will, the author insists on the importance of the movement-idea in the performance of a voluntary action and on the cooperation of expectancy of and practice in the particular action. Instinct, motive, and interest are in turn duly considered.

The next chapter is devoted to a discussion of the influence of the will, suggestion, and similar psychical factors on disorders of perception; and many interesting cases bearing on the subject are reported, of which the following is a typical example. A man was afflicted with a tickling in his throat shortly after kissing his sweetheart, and he became convinced that it was due to a hair in his throat. His doctor examined the throat and found nothing more than a slight pharyngitis, which was treated in the usual way. Before the next visit, when the patient was no better and still convinced of the presence of the foreign body, the medical man had provided himself with a hair, which he surreptitiously introduced into but ostentatiously withdrew from the throat. The tickling was instantaneously and permanently cured.

In the last chapter, dealing with reflex disorders and their treatment, the author first points out that attention to a stimulus strengthens the reflex which it excites, and he makes special reference to Haab's cortical pupillary reflex. Many examples are then given of the cure by hypnotism, &c., of such reflex disorders as sea-sickness, the vomiting of pregnancy, hiccough, nervous diarrhoea, nocturnal enuresis, morbid blushing, palpitation, hay fever, nervous cough, asthma, &c. It will be a surprise to most people that the periods of menstruation may be modified by suggestion.

The volume concludes with an account of some cases of chorea and other functional disorders of the nervous system successfully treated by hypnotism. There is a good index, and we can cordially recommend the work to those interested in the subject.

#### THE STRUCTURE OF THE SCALLOP.

*Pecten.* By W. J. Dakin. Being No. 17 of the Memoirs issued by the Liverpool Marine Biology Committee. Pp. viii+136; 9 plates. (London: Williams and Norgate, 1909.) Price 4s. 6d.

THE scallop, clam or queen as it is called in different parts of our coasts is an animal of considerable interest. To the pilgrims of the Middle Ages who sought the famous shrine of St. James of Compostella, the shell was both a badge and a bowl, and from this old association it has become incorporated in many coats of arms, as, for instance, in that of the city of Reading. More utilitarian is the interest associated with the scallop as an article of food, and in this respect the rare delicacy of its flavour should bring "queens" into greater favour than they now enjoy. To the more curious inquirer the scallop offers many attractive features, both in its structure and habits. The gem-like green eyes that sparkle under the fringe of tentacles have